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ON DR. CHAPUT'S NEW ANASTOMOSIS BUTTONS FOR GASTRO-INTESTINAL SURGERY.

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My distinguished *confrère*, Dr. Chaput, Surgeon to the Paris Hospitals, has had the kindness to send me a set of his new anastomosis buttons for use in gastro-intestinal surgery, and as they appear to me of the greatest practical value, not only on account of their perfect simplicity, but the simple technique employed, I feel that a description of the instrument and a concise report of the cases in which they have been used may be of considerable interest to those occupied in abdominal surgery.

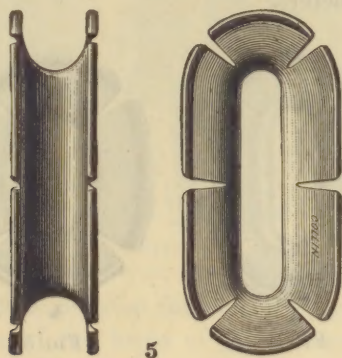
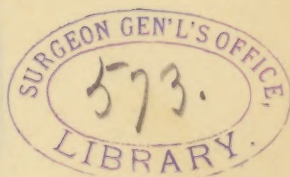


FIG. 1.

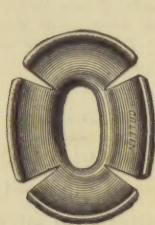
Before entering into my subject I desire to thank Dr. Chaput, not only for the buttons but for his kindness in sending the electrotypes which illustrate this article. There are in all five buttons, and I will take for demonstration the button shown in Fig. 1, which is the largest size, and is intended for gastro-enterostomy and entero-anastomosis.

Full view shows that it has the form of an elliptical ring. The central orifice measures five millimeters in breadth and thirty

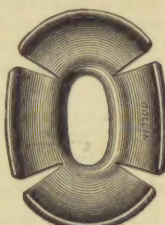
presented by the author -



in length. This orifice is bordered by a rim, separated into six sections by V-shaped openings. When seen in profile a central groove will be remarked, which measures seven millimeters in depth and ten in breadth. The entire length of this button is about forty-five millimeters, in breadth from twenty to twenty-

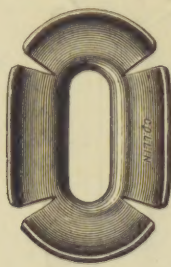


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FIG. 2.

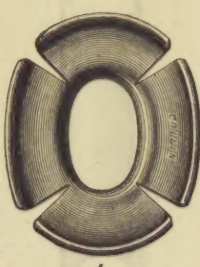


2
FIG. 3.

one. The circumference is sixty-two millimeters when the borders of the groove are not brought together, but when this has been done by pressing them with the fingers, it is only from fifty to fifty-two millimeters.



3
FIG. 4.



4
FIG. 5.

The buttons are made of pure tin and are extremely malleable.

Button No. 1 has an orifice of 10 x 5 millimeters, and a groove six millimeters deep by ten in breadth. It is used for cholecyst-enterostomy or for circular anastomosis of the small intestine. (Fig. 2.)

Button No. 2 has an orifice of 10 x 5 millimeters, and a groove seven millimeters deep by ten millimeters in breadth, and is intended for circular section of the small intestine. (Fig. 3.)

Button No. 3 has an orifice of 12 x 5 millimeters, the groove

being of the same dimensions as button No. 3. It is also used in circular section of the small intestine. (Fig. 4.)

Button No. 4, orifice 15 x 10 millimeters, groove 7 x 10 millimeters. Used for circular section of the large intestine. (Fig. 5.)

Button No. 5 (Fig. 1) has already been demonstrated, as well as its uses.

To give a general idea of the use of the buttons we will suppose that an entero-anastomosis is to be performed with button

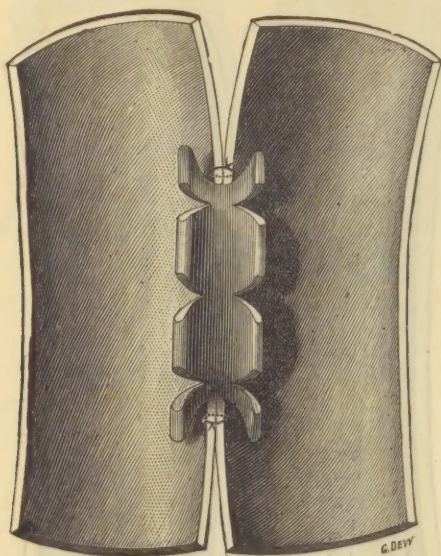


FIG. 6.

No. 5. A longitudinal incision sufficiently long to insert the button is made on one of the loops of gut. A purse-string suture is then placed in the lips of the orifice of the incision, the button is inserted and the suture drawn tight and tied at the bottom of the groove, so that when this is accomplished one half of the instrument is in the loop of intestine, the other remaining outside.

The same incision and suture on the other loop of intestine, and the half of the button emerging from the other loop of gut is inserted; the suture of the second incision is tied at the bottom of the groove. *Figure 6* shows an entero-anastomosis with the button in place, the borders of the gutter still open.

The borders of the groove are then pressed together from the outside of the intestine, thus saving a plan of sutures. *Figure 7* shows the borders of the groove brought together by pressure with the fingers. A few sero-serous sutures placed some distance apart may complete operation if necessary.

As is readily remarked, the principle of these buttons is that *the borders of the groove are malleable and may be easily pressed together with the fingers.*

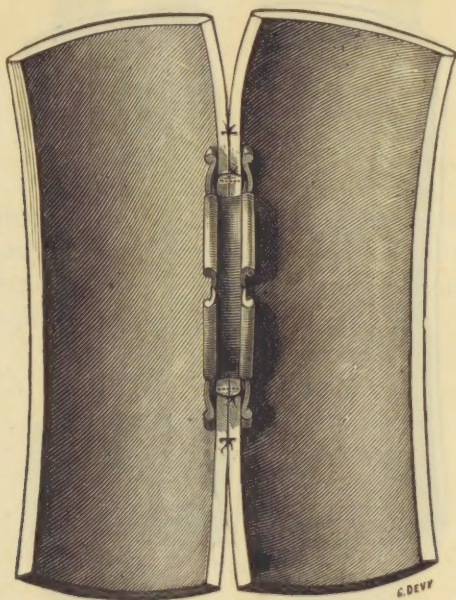


FIG. 7.

The V-shaped openings in the borders increases the flexibility of the metal and divides the work of pressing them together into several segments which are successively compressed. A fact to be noted is that *it is easier to close the groove than to open it after the borders are pressed together*; and from this it may be seen that as a means of reunion these buttons are firm but in no way dangerous.

The technique that has just been described is good for a demonstration, but as a procedure it has many bad points.

The *modus operandi* will now be described :

Entero-anastomosis. First Step. Both loops of the gut are incised ; on the posterior lips of the incisions (those the farthest from the operator) a running suture is placed bringing them together. (Fig. 8.)

Second Stage. The posterior groove of the button is placed on the suture, while the upper thread of the suture is brought over

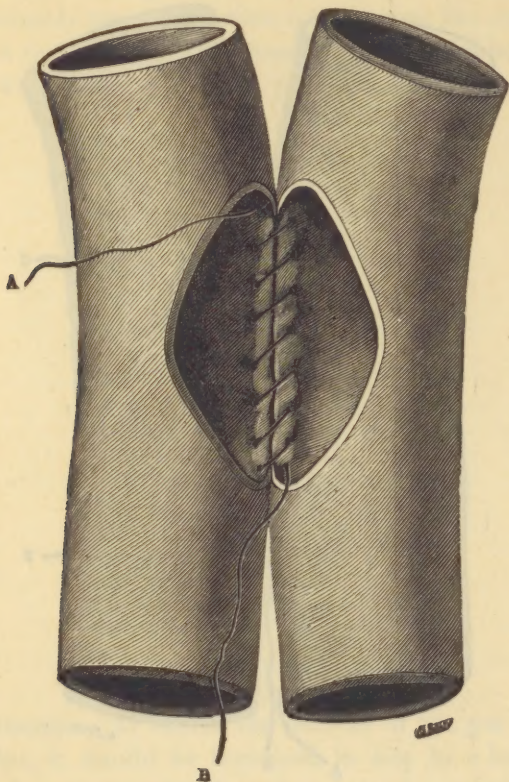


FIG. 8.

into the anterior groove and both ends of the suture are tied, not in the middle of the groove, but at the end. (Fig. 9.)

Third Step. The button is pushed either to the right or left in order to expose the posterior groove, into which a silk suture is passed and held in place. (Fig. 9. C D, the dotted line represents the course of the thread.) The button is then put back in its former position.

Fourth Step. A running suture is then made in the anterior lips of the incisions with the upper ends (C) of the thread (C D). In Figure 10 the running suture is not finished, while in Figure 11 it is completed, and it only remains to tie the ends C and D.

Fifth Step. The upper or anterior suture is depressed with a grooved director, and the borders of the grooves of the button

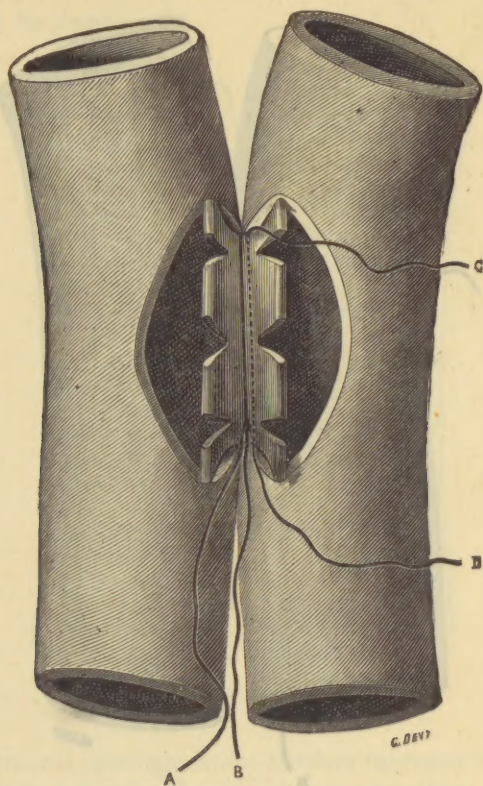


FIG. 9.

are pressed together with the fingers through the walls of the gut. If apposition is perfect, complementary sutures are unnecessary, but if this is not the case a few sero-serous sutures placed about one centimeter apart will be sufficient; eight will be found enough for button No. 4.

The technique of gastro-enterostomy and cholecystenterostomy is exactly the same as for entero-anastomosis.

Circular Suture. Both ends of the gut are treated in the same manner as in entero-anastomosis. A purse-string suture is placed in the posterior semi-circumference of both ends of the intestine and then tied on the button. A second thread is stitched into the posterior groove of the button; with one of its ends a running suture will be made in the anterior lips of the intestine, then tied, and the borders of the groove pressed together. (Fig. 12.)

It is absolutely necessary before commencing the operation to make certain that the size of the button selected will be of proper dimensions to keep the instrument *perpendicular to the gut* during

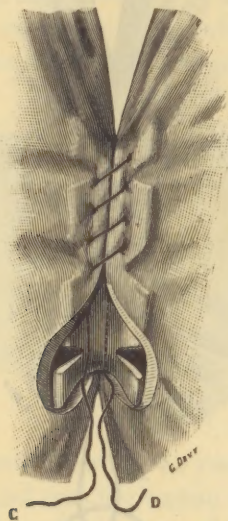


FIG. 10.

its sojourn therein. If one of the orifices of the gut is smaller than the other, it should be increased in size by a longitudinal slit, and the loose triangular flaps thus formed are excised.

Dr. Chaput advises that the sutures employed should be of strong medium-sized silk, as fine silk would break. A straight needle, that of Reverdin in particular is very good.

The operation with Dr. Chaput's button is very quickly done, more so than with Murphy's, because only one plan of sutures is used, while with the latter's instrument two plans are necessary.

Dr. Chaput's largest button is smaller in circumference than the smallest Murphy button; the latter measures 66 millimeters

in circumference, while the former, after the groove has been pressed together, hardly exceeds 55 to 60 millimeters.

The orifice of each of Chaput's buttons is very much broader than the corresponding Murphy button. With the former an exact idea of the amount of constriction can be obtained, and, what is more, *it is impossible to press too hard*, because the flexibility of the instrument does not allow of a too severe compression.

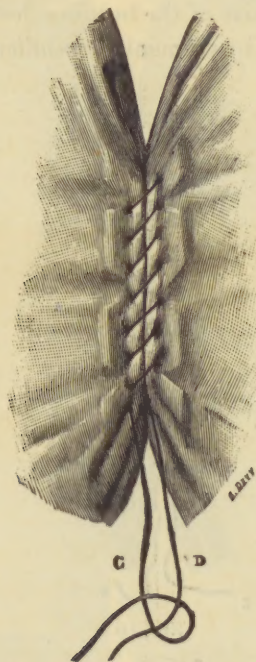


FIG. 11.

Now, on the contrary, with the Murphy button there is a tendency to press too tightly, and frequently necrosis or a perforation is the result.

All surgeons have found that when once the Murphy button has been articulated it can not be disarticulated. Now, with Chaput's button, the borders of the groove can easily be separated with a grooved director.

In several cases the orifice of Murphy's button has become blocked up with the feces or alimentary substance; this danger

is to be less feared with Chaput's button, whose orifice is very short, only measuring a few millimeters.

Murphy's button is a delicate instrument and easily gets out of order; Chaput's button is so simple that there is nothing to get out of order. Murphy's button has too small an orifice for the operation of gastro-enterostomy; Chaput's instrument gives a definitive opening of from six to eight centimeters in length, thus rendering consecutive stenosis far less probable.

We now come to the most important point. Murphy's button *is only liberated by a necrosis of the intestine*; Chaput's button *causes no necrosis*. And he proves this by his first case, which died forty-eight hours after operation from pulmonary congestion due to the ether, and the second case in whom death occurred on the

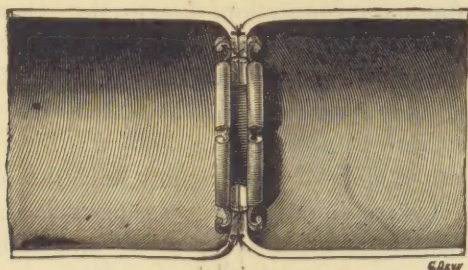


FIG. 12.

tenth day from persistent vomiting, the tissues presented no trace of necrosis. In his third case the button came into the rectum on the tenth day, and at the bottom of the groove both purse-string sutures were found, but there was no necrosed tissue between the borders of the instrument.

Mechanism of Elimination. The pressing together of the groove holds the intestine but does not compress it too strongly. After the button is applied and pressed together it is easy to extract it from the intestine by slight traction, after having cut the purse-string sutures.

The purse-string sutures which hold, as they do, the borders of a large orifice around the much smaller one of the button, pull strongly on the tissues. After a few days they cut through these structures and the pressure of the groove is not sufficient to prevent the tissues from escaping from their grasp, solicited as they are by their natural elasticity.

The intestinal orifice, strictured as it is by the sutures, tends consequently to return to its former dimensions, which it does by escaping from the groove of the button as soon as the sutures no longer constrain it. When the borders of the anastomotic orifice have become completely free the button falls into the lower end of the intestine because it is pushed by the contents of the alimentary canal.

Clinical Results. The first case was that of a man with cancer of the pylorus, in extreme cachexia, and with tuberculosis as well. Chaput performed a gastro-enterostomy with his button. The upper end of the intestine was surrounded with iodoform gauze and the anastomosis was established between the loop which went toward the stomach and that which went away, in order to re-establish the flow of bile through the intestinal canal. Patient died from pulmonary congestion, due to the ether, forty-eight hours later. The autopsy confirmed the pulmonary lesions and the integrity of the peritoneum and the sutures. There was no necrosis of the tissues comprised in the grasp of the button.

The second patient presented symptoms of serious pyloric stenosis, and an exploratory laparotomy only showed a bend in the pylorus. Gastro-enterostomy was performed. After the operation the patient vomited so repeatedly and with such intensity that the sutures of the abdominal walls gave way, and the intestine had to be replaced within the abdomen and the wall sutured again. Death took place from exhaustion on the tenth day. By going over the history of the patient Chaput arrived at the conclusion that the vomiting was due to the commencement of tabes dorsalis, because he found certain details which allowed of this opinion. However, whatever it might have been, the autopsy showed the integrity of the peritoneum; the gastro-enterostomy was perfect, and it would seem that the method must have been good to have resisted such violent vomiting for ten days. The button was in its place and the tissues in the grasp of the groove were adherent and not necrosed.

The third case reported by Chaput was a man, aged seventy-one, with a carcinoma of the transverse colon. An anastomosis between the small intestine and the sigmoid flexure was performed with the button. The patient supported the operation well, but was subsequently overtaken by intestinal paralysis

which had no relation to the operation, but was due to the distension of the large intestine by gas, the feces collecting there without being expelled on account of both the neoplasm and the ilio-cecal valve. A second laparotomy was performed, and showed perfect integrity of the peritoneum and of the sutures, and also that the button had gone. Complete section and obliteration of the end of the small intestine between the anastomosis and the cecum was executed, and the operation terminated by an artificial anus in the transverse colon.

When the operation was completed rectal examination with the fingers revealed the button, which was withdrawn. In its groove were found the purse-string sutures and no necrosed tissue.

The fourth case was that of a woman, aged fifty-eight, with cancer of the pylorus. Gastro-enterostomy, ligature of the upper end of the intestine, and entero-anastomosis, to establish the course of the bile which was cut off by the ligature of the intestine, were executed. The patient was operated upon on September 27, 1895, and was still alive December 11, 1895. Her digestion was quite good, vomiting had ceased, and the gastric dilatation had disappeared. The buttons were not found in the feces.

These four cases show that (1) the employment of these buttons is rational and benign, and that up to the present no objection can be raised against this method; (2) that the buttons are easily expelled; (3) there is no necrosis of the tissues comprised within the grasp of these buttons.

